

THE CLAIMS

What is claimed is:

1. A method for producing microcapsules containing a material to be encapsulated, which comprises coacervating, in an aqueous medium and in the presence of the material to be encapsulated, a mixture of at least one solubilized plant protein and a polyelectrolyte having an opposite charge to the protein is subjected to form microcapsules comprising a complex coacervate of the plant protein and polyelectrolyte about the material to be encapsulated.
2. The method according to claim 1, wherein the coacervating step is followed by hardening of the microcapsules.
3. The method according to claim 1, which further comprises, prior to the coacervating step:
 - solubilizing the at least one plant protein in an aqueous medium at a pH that is between 2 and 7 to obtain the solubilized plant protein in a solution;
 - centrifuging the solution to obtain a supernatant and a pellet; and
 - mixing the supernatant with an aqueous solution of the polyelectrolyte having the opposite charge of that of the plant protein.
4. The method according to claim 3, which further comprises increasing soluble plant proteins in the microcapsules by adding additional plant proteins to the supernatant followed by centrifuging the resultant mixture to obtain increased amounts of plant proteins in the supernatant for mixing with the polyelectrolyte, with optionally repeating of the preceding steps several times if necessary.
5. The method according to claim 3, wherein the solubilizing step is carried out at a pH below the isoelectric pH of the plant protein, so that the protein can be used as a cationic polyelectrolyte in the coacervating step.
6. The method according to claim 3, wherein the solubilizing step is carried out at a pH above the isoelectric pH of the plant protein so that the protein can be used as an anionic polyelectrolyte in the coacervating step.

7. The method according to claim 1, wherein the plant proteins are extracted from plants chosen from the group consisting of lupin (genus *Lupinus*), soybean (genus *Glycine*), pea (genus *Pisum*), chickpea (*Cicer*), alfalfa (*Medicago*), broad bean (*Vicia*), lentil (*Lens*), bean (*Phaseolus*), rapeseed (*Brassica*), sunflower (*Helianthus*) and a cereal.

8. The method according to claim 7, wherein the plant proteins are extracted from a cereal selected from the group consisting of wheat, maize, barley, malt and oats.

9. The method accordingly to claim 1, wherein the cationic polyelectrolyte is chosen from the group comprising cationic surfactants, latexes that include a quaternary ammonium, chitosan and plant proteins having a pH below the isoelectric pH.

10. The method accordingly to claim 1, wherein the anionic polyelectrolyte is chosen from the group consisting of sodium alginate, gum arabic, polyphosphates, sodium carboxymethylcellulose, carrageenan, xanthan gum and plant proteins having a pH above the isoelectric pH.

11. The method according to claim 2, wherein the hardening is carried out by crosslinking with a crosslinking agent.

12. The method according to claim 11, wherein the crosslinking agent is selected from the group consisting of dialdehydes and tannins.

13. The method according to claim 12m wherein the dialdehyde is glutaraldehyde and the tannin is tannic acid.

14. The method according to claim 2, wherein, when the cationic polyelectrolyte is chitosan, the hardening is carried out using acetic anhydride as hardening agent.

15. Microcapsules produced by the method of claim 1.

16. Microcapsules obtainable by the method of claim 1.

17. Microcapsules comprising a complex coacervate made of a mixture of plant protein and a polyelectrolyte configured encapsulating a material.

18. A pharmaceutical, veterinary, cosmetic, agrofood, chemical or biomedical composition comprising the microcapsules according to claim 15.

19. A pharmaceutical, veterinary, cosmetic, agrofood, chemical or biomedical composition comprising the microcapsules according to claim 16.

20. A pharmaceutical, veterinary, cosmetic, agrofood, chemical or biomedical composition comprising the microcapsules according to claim 17.